

**APPENDIX I**  
**METHOD FOR DETERMINING STATIC PULL-OUT STRENGTH**  
**BEFORE AND AFTER REHEATING**

(Normative)

**I1 SCOPE** This Appendix sets out a method for determining the strength required to pull cords from the carcass of conveyor belting before and after reheating.

**I2 PRINCIPLE** The force required to extract cords from a unit length of belting is determined by the application of a steady, controlled rate of strain using a tensile testing machine.

**I3 APPARATUS**

**I3.1 Suitable tensile testing machine**—capable of exerting steady rates of strain without interruption and of measuring the test force with an error of not more than  $\pm 2$  percent. The rate of separation of the jaws of the tensile testing machine shall be  $100 \pm 10$  mm/min.

**I3.2 Press**—consisting of two plates which are thermoregulated at  $145 \pm 5^\circ\text{C}$  and capable of applying a surface pressure between 1 MPa and 5 MPa.

NOTE: An adequate surface pressure can be obtained using spacers of a thickness of the test piece minus  $1 \pm 0.5$  mm between the plates of the press.

**I4 TEST PIECES** Three test pieces shall be cut from a full thickness section of the belting containing five cords. Test pieces shall be cut to the arrangement shown in Figure I1 or Figure I2. The test length ( $L_1$ ) shall be  $50 \pm 2$  mm. The covers may be removed 100 mm from the end of the test piece to facilitate the use of conventional grips.

**I5 PROCEDURE**

**I5.1 Without reheating** Mount each test piece centrally in the jaws of the tensile testing machine and operate the machine until failure occurs.

**I5.2 With reheating** Pre-condition the three test pieces between the two plates of the press for  $150 \pm 1$  min. Mount each test piece centrally in the jaws of the tensile testing machine and operate the machine until failure occurs.

**I6 CALCULATION** The unit pull-out strength for each test piece shall be calculated from the following equation:

$$\text{Unit pull-out strength (kN/m)} = \frac{\text{Pull-out force (kN)} \times 1000}{\text{Measured test length } L_1 \text{ (mm)}}$$

**I7 REPORT** The report shall include the following information:

- (a) Average pull-out strength of the three test pieces, before reheating, in kilonewtons per metre.
- (b) Average pull-out strength of the three test pieces, after reheating, in kilonewtons per metre.
- (c) Reference to this Appendix, i.e. AS 1333, Appendix I.

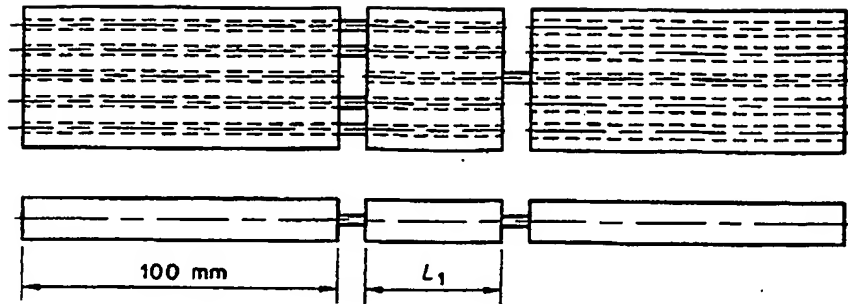
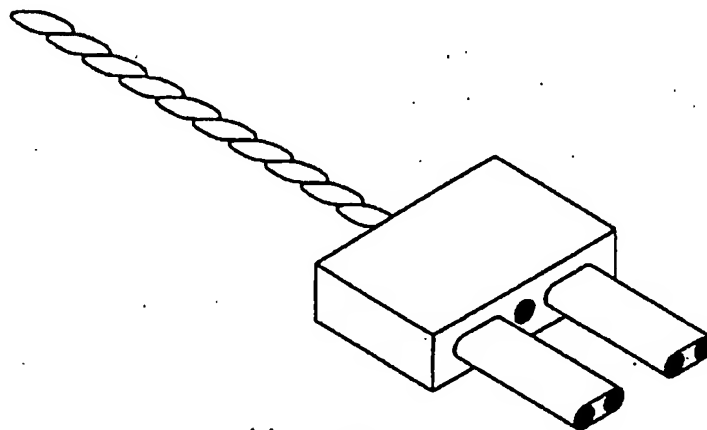
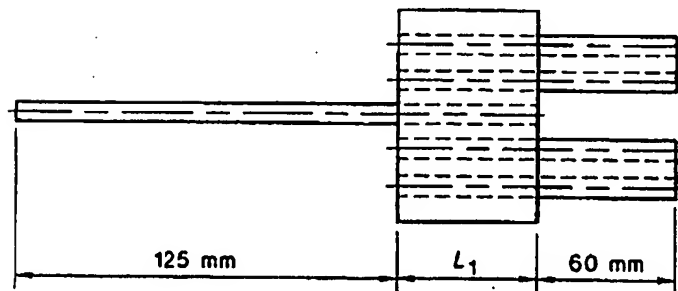


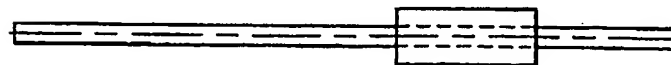
FIGURE 11 TEST PIECE FOR PULL-OUT STRENGTH



(a) Isometric view



(b) Top view



(c) Front view

DIMENSIONS IN MILLIMETRES

FIGURE 12 TEST PIECE FOR PULL-OUT STRENGTH (Alternative shape)

**APPENDIX K**  
**METHOD FOR DETERMINING DYNAMIC CORD PULL-OUT**  
**FATIGUE RESISTANCE**

(Normative)

**K1 SCOPE** This Appendix sets out the method for determining the dynamic strength of the cord-to-rubber bond in a steel cord reinforced belt.

**K2 PRINCIPLE** The dynamic strength of the cord-to-rubber bond is determined by applying a cyclic load to a test piece for a minimum number of cycles, or till failure of the bond occurs.

**K3 APPARATUS** A suitable testing machine which can accommodate the test piece and which is capable of applying a steady cyclic tensile loading, is required. The cyclic load ranges from 3.6 percent to 36 percent of the nominal static pull-out strength for a given cord diameter (see Figure K1).

**K4 TEST PIECE** A test piece shall be cut from a full thickness section of the belting containing five cords. The test piece shall be cut to the arrangement shown in Figure I1 or Figure I2. The test length ( $L_1$ ) shall be  $100 \pm 2$  mm. The covers may be removed 100 mm from the end of the test piece to facilitate the use of conventional grips.

**K5 PROCEDURE** The procedure shall be as follows:

- (a) Mount the test piece centrally in the jaws of the machine.
- (b) Steadily apply the cyclic load and release it with a pause at the high and low levels (see Figure K1). (The time for one completed cycle shall be between 5 s and 10 s.)
- (c) Continue the test until the sample fails or 10 000 cycles are completed, whichever comes first.

**K6 REPORT** The following information shall be reported:

- (a) Whether the sample failed, i.e. there was evidence of cord pull-out, before 10 000 cycles were completed.
- (b) The nominal static pull-out strength for the cord being tested.
- (c) The maximum and minimum load levels.
- (d) A reference to this Appendix, i.e. AS 1333, Appendix K.

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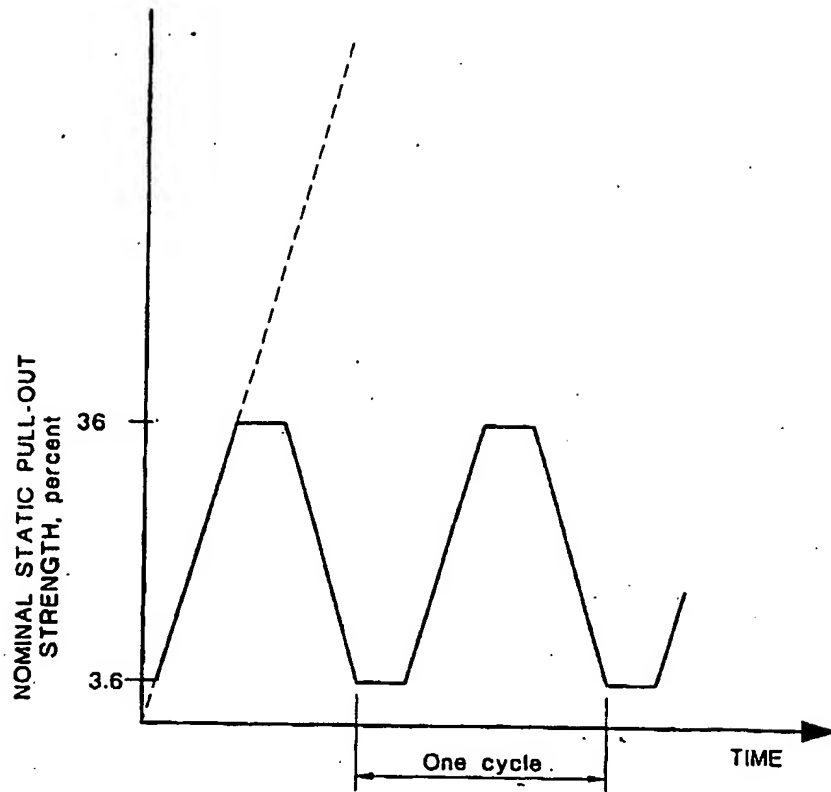


FIGURE K1 TYPICAL CYCLIC LOADING PATTERN

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